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13. ABSTRACT (Maximum 200 words)  This Performance Oriented Packaging (POP) test was performed to ascertain whether the Mk 708 Mod 0 Shipping and Storage Container (Packing Group II) meets the requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was an inert Mk 210 Mod 0 Vertical Launch Digital Autopilot Control (DAC) unit weighing 12 kg (25 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 1 kg (2 pounds) were added. Gross weight of the loaded container was 27 kg (60 pounds).					
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**PERFORMANCE ORIENTED PACKAGING TESTING  
OF  
CONTAINER, SHIPPING AND STORAGE, MK 708 MOD 0  
FOR PACKING GROUP II SOLID HAZARDOUS MATERIALS**

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August 1992

**FINAL**

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## INTRODUCTION

This Performance Oriented Packaging (POP) test was performed to ascertain whether the Mk 708 Mod 0 Shipping and Storage Container (Packing Group II) meets the requirements specified by the Code of Federal Regulations, Title 49 CFR, Parts 107 through 178, dated 31 December 1991. The packaged commodity used for the test was an inert Mk 210 Mod 0 Vertical Launch Digital Autopilot Control (DAC) unit weighing 12 kg (25 pounds). This represents the current maximum commodity weight. To compensate for future growth variations in commodity and/or packaging, 1 kg (2 pounds) were added. Gross weight of the loaded container was 27 kg (60 pounds).

Due to unavailability only one container was used for testing. This is less than the number required by the regulations. Approval for this deviation has been granted by the Under Secretary of Defense, Memorandum for the Joint Logistics Commanders dated 22 February 1990.

## TESTS PERFORMED

### 1. Base Level Vibration Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.608. The container was placed on a repetitive shock platform which has a vertical linear motion of 1-inch double amplitude. Movement of the container was restricted during vibration in all but the vertical direction. The frequency of the platform was increased until the container left the platform 1/16 of an inch at some instant during each cycle. Test time was 1 hour.

### 2. Stacking Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.606. The container was subjected to a force applied to its top surface equivalent to the total weight of identical packages stacked to a minimum height of 3 meters (including the test container). A weight of 141 kg (310 pounds) was stacked on the test container. The test was performed for 24 hours. The weight was then removed and the container examined.

### 3. Drop Test

This test was performed in accordance with Title 49 CFR, Part 178, Subpart M, Sec. 178.603. Six drops were performed from a height of 1.2 meters (4 feet) in the following orientations (three drops for each orientation):

- a. Horizontally.
- b. Diagonally on the edge between the cover assembly and the top ring of the container.

## **PASS/FAIL**

### **1. Base Level Vibration Test**

The criteria for passing the base level vibration test is outlined in Title 49 CFR, Sec. 178.608(c): No test sample should show any deterioration which could adversely affect transportation safety or any distortion liable to reduce packaging strength.

### **2. Stacking Test**

The criteria for passing the stacking test is outlined in Title 49 CFR, Sec. 178.606(d): No test sample may show any deterioration which could adversely affect transportation safety or any distortion likely to reduce its strength, cause instability in stacks of packages, or cause damage to inner packagings likely to reduce safety in transportation.

### **3. Drop Test**

The criteria for passing the drop test is outlined in Title 49 CFR, Sec. 178.603(f): A package is considered to successfully pass the drop tests if for each sample tested, no rupture occurs which would permit spillage of loose explosive substances or articles from the outer packaging.

## **TEST RESULTS**

### **1. Base Level Vibration Test**

Satisfactory.

### **2. Stacking Test**

Satisfactory.

### **3. Drop Test**

Satisfactory.

## **DISCUSSION**

### **1. Base Level Vibration Test**

The input vibration frequency was 4.1 Hz. Immediately after the vibration test was completed, the container was removed from the platform, turned on its side and inspected. No unfavorable distortion or deterioration was observed.

**2. Stacking Test**

The container was inspected after the 24-hour period was over. No unfavorable distortion or deterioration was observed.

**3. Drop Test**

After each drop, the container was inspected. The contents were completely retained by the container.

**REFERENCE MATERIAL**

A. Code of Federal Regulations, Title 49 CFR, Parts 107-178.

B. Bureau of Explosives Tariff No. BOE 6000K Hazardous Materials Regulations of the Department of Transportation by Air, Rail, Highway, Water including Specifications for Shipping Containers.

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Crane, IN 47522-5000

## TEST DATA SHEET

<b>POP MARKING:</b>	
UN 1A2/Y28/S/**/USA/DOD/NAD	
**YEAR LAST PACKED OR MANUFACTURED	
<b>DATA SHEET:</b>	
Container: Mk 708 Mod 0 Shipping and Storage Container	
Type: 1A2	Container P/N or NSN: NSN 1420-01-298-7581
Drawing Number: 6116622	Material: Steel
Gross Weight: 27 kg (60 pounds)	Dimensions: 20" dia x 20" H
Closure (Method/Type): Locking Ring	Tare Weight: 15 kg (33 pounds)
Additional Description:	
<b>PRODUCT:</b>	
Name: See table 1	NSN(s): See table 1
United Nations Number: See table 1	
United Nations Packing Group: II	
Physical State (Solid, Liquid, or Gas): Solid	
Vapor Pressure (Liquids Only): N/A      At 50 °C: N/A      At 55 °C: N/A	
Consistency/Viscosity: N/A	Density/Specific Gravity: N/A
Amount Per Container:	Flash Point: N/A
Net Weight: See table 1	
<b>TEST PRODUCT:</b>	
Name: Digital Autopilot Control (DAC)	Physical State: Solid
Consistency: N/A	Density/Specific Gravity: N/A
Test Pressure (Liquids Only): N/A	
Amount Per Container: N/A	Net Weight: 12 kg (27 pounds)
Additional Description:	
The net weight includes the net maximum product weight plus an additional 1 kg (2 pounds).	

**TABLE 1**  
**Products Approved for Shipping in the**  
**Mk 708 Mod 0 Shipping and Storage Container**

NALC	NSN	Product Type	Packing Drawing	Haz Class/Div	UN Number	Units/Cntr	Total Net Weight (lb)	Total Gross Weight (lb)
5W85	4T 1420-01-298-7581	Vertical Launch DAC	6206160	1.4S	0349	1	25	58

DAC = Digital Autopilot Control